



Goddard Procedural Requirements (GPR)

DIRECTIVE NO. GPR 1820.1B
EFFECTIVE DATE: May 16, 2014
EXPIRATION DATE: May 16, 2019

APPROVED BY Signature: Original Signed By
NAME: Judith N. Bruner
TITLE: Director, Safety and Mission Assurance

COMPLIANCE IS MANDATORY

Responsible Office: 350 / Occupational Safety & Health (OS&H) Division

Title: Hearing Conservation Program

PREFACE

P.1 PURPOSE

This directive defines the requirements that constitute the Hearing Conservation Program at the Goddard Space Flight Center (GSFC) to prevent noise-induced hearing loss.

P.2 APPLICABILITY

This directive applies to all GSFC civil service employees. GSFC contractors, tenant organizations, grantees, clubs, and other organizations operating under the auspices of GSFC, or on GSFC property, shall administer their own hearing conservation programs that meet the requirements of NPR 1800.1 and Sections 2 and 3 of this GPR.

P.3 AUTHORITY

- a. NPD 1800.2, NASA Occupational Health Program; and
- b. NPR 1800.1, NASA Occupational Health Program Procedures.

P.4 APPLICABLE DOCUMENTS

- a. 29 Code of Federal Regulations (CFR) 1910.95, Occupational Safety and Health Administration (OSHA) Occupational Noise Exposure;
- b. 29 CFR 1904.10, OSHA Recording and Reporting Occupational Injuries and Illness;
- c. GPR 1840.2, Industrial Hygiene Program;
- d. GPR 8621.4, GSFC Mishap Preparedness and Contingency Plan;
- e. American National Standards Institute (ANSI) Standard S1.4 Specification for Sound Level Meters;
- f. ANSI Standard S1.25 Specification for Personal Noise Dosimeters;
- g. ANSI Standard S3.1-1999 Maximum Permissible Ambient Noise Levels for Audiometric Test Rooms;
- h. ANSI Standard S3.6-1969 Specification for Audiometers;
- i. NASA Form 1707, Special Approvals and Affirmations of Requisitions;
- j. GSFC Form 17-26, Exit Clearance Record;
- k. GSFC Form 17-26W, Exit Clearance Record/Wallops;
- l. GSFC Form 23-59, Initiator's Acquisition Checklist; and

CHECK THE GSFC DIRECTIVES MANAGEMENT SYSTEM AT
<http://gdms.gsfc.nasa.gov> TO VERIFY THAT THIS IS THE CORRECT VERSION PRIOR TO USE.

m. GSFC Form 23-73, Environmental Checklist, Facilities;

P.5 CANCELLATION

GPR 1820.1A, Hearing Conservation Program

P.6 SAFETY

All personnel who perform surveys in conjunction with this document shall comply with all worksite safety and health requirements.

P.7 TRAINING

- Employees enrolled in the Hearing Conservation Program because of noise exposure described in Section 2 shall receive training to include the elements in Section 3.5.
- Supervisors of employees enrolled in the Hearing Conservation Program shall also receive training to include the elements in Section 3.5.
- Personnel who conduct noise assessments shall have demonstrated competence in recognizing potential noise hazards and performing noise hazard evaluations through professional experience, and be knowledgeable of the contents of this GPR.
- Occupational hearing conservationists who administer audiometric testing shall be certified by the Council for Accreditation in Occupational Hearing Conservation (CAOHC) and receive 5-year refresher training, or be an audiologist, in accordance with NPR 1800.1.

P.8 RECORDS

Record Title	Record Custodian	Retention
Employee Audiograms and Medical Evaluations	Medical and Environmental Management Division (MEMD), Health Unit (Greenbelt or WFF)	<u>*NRRS 1/127A1(b)</u> Thirty days after separation, transfer to National Personnel Records Center (NPRC), St. Louis, MO. NPRC will destroy 75 years after birth date, 60 years after date of the earliest document in the folder if the date of birth cannot be ascertained, or 30 years after latest separation, whichever is later.
Audiometer Calibrations	MEMD, Health Unit (Greenbelt or WFF)	<u>*NRRS 8/41.5B</u> . Cut off upon audit, analysis or quality check. Delete 5 years after cut-off.
Employee Noise Dosimetry Results and Reports	OS&H Division, Industrial Hygiene Office (IHO)	<u>*NRRS 1/127A1(b)</u> .
Request-Based Area Sound	OS&H Division, IHO	<u>*NRRS 1/124</u> Retire to Federal

Level Survey Results and Reports		Records Center (FRC) when 3 years old. Destroy when 10 years old.
Training Records of Employees Enrolled in Hearing Conservation Program	Office of Human Capital Management	*NRRS 3/33G1. Destroy 5 years after employee discontinues or completes training.
Hearing Conservation Program Removal Letter	OS&H Division, IHO	*NRRS 1/127A1(b)

*NRRS – NASA Records Retention Schedules ([NPR 1441.1](#))

P.9 MEASUREMENT/VERIFICATION

The civil service Industrial Hygienist will maintain statistics on the performance of the Hearing Conservation Program. The statistics are compiled, reviewed, and reported at least annually to the OS&H Division Chief. These statistics may include, but are not limited to:

- Number of employees enrolled in the Hearing Conservation Program that receive audiometric testing and hearing conservation training in relation to the number of employees enrolled in the Hearing Conservation Program;
- Number of employees newly identified for enrollment and number of employees removed from the Program;
- Number of employees enrolled in the Program who received an annual audiometric test within one month of their due date in relation to the number of employees enrolled in the Program;
- Number of employees enrolled in the Program who received annual training within one month of their due date in relation to the number of employees enrolled in the Program;
- Among employees enrolled in the Program, number of audiometric tests indicating an average hearing reduction greater than 10 dB in the 2000, 3000, and 4000 Hertz frequencies;
- Percentage of Program participants who received re-training after incurring a standard threshold shift (STS);
- Number of occupational noise exposure assessments completed;
- Median number of days from requests for noise exposure assessment to noise exposure assessment;
- Number of instances in which engineering controls, administrative controls, and personal protective equipment (PPE) were recommended; and
- Percentage of training evaluation questionnaires with above average to excellent ratings in relation to the total number of evaluation questionnaires.

PROCEDURES

In this document, a requirement is identified by “shall,” a good practice by “should,” permission by “may” or “can,” expectation by “will,” and descriptive material by “is.”

1. RESPONSIBILITIES

1.1 The Center Director ensures that:

- a. A safe and healthful workplace, free of undue hazardous noise to the extent feasible, is provided for all GSFC personnel; and
- b. All recognized noise hazards are controlled to the greatest possible extent.

1.2 Directors of shall:

- a. Ensure that a directorate process is in place for reviewing design and modification packages for systems involving the generation of hazardous noise, or which have the potential to expose civil service employees and contractors to hazardous noise; and
- b. Follow the Agency’s “Buy Quiet and Quiet by Design” approach to noise emission when purchasing and designing equipment that is expected to generate noise levels of concern for hearing conservation (80 dBA and higher).

1.3 The OS&H Division IHO shall:

- a. Administer, evaluate, and review the GSFC Hearing Conservation Program to ensure compliance with NPR 1800.1 and NPD 1800.2;
- b. Identify civil service employees required to participate in a hearing conservation program through quantitative and qualitative noise exposure assessments, and during health hazard evaluations;
- c. Identify hazardous noise areas and equipment generating hazardous levels of noise during comprehensive baseline, follow-up, and request-based industrial hygiene (IH) surveys of GSFC codes, operations, and areas;
- d. Notify civil service employees in writing of their personal noise monitoring results, and of their enrollment status in the GSFC Hearing Conservation Program when exposure exceeds the action level of 82 dBA;
- e. Provide supervisors, site management, contractor representatives, contracting officers, contracting officer’s representatives (CORs), and other affected employees or responsible safety organizations with:
 1. Results of noise exposure assessments and sound level surveys with findings, recommendations, and action items;
 2. Notification of requirements for civil service employees to participate in the Hearing Conservation Program, upon employee consent, if noise dosimetry results indicate exposure at or greater than the action level;
 3. Notification of job titles in which exposure to noise may require inclusion in a hearing conservation program and the requirement for a contractor to conduct its own noise dosimetry or

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- sound level survey to determine if noise exposure to its personnel is at or greater than the action level (which would require a hearing conservation program);
4. Facility sites that have been designated as noise hazard areas;
 5. Recommended methods for the elimination or control of noise hazards;
 6. Technical assistance in the design and implementation of engineering controls, work practices, and selection of PPE when requested;
 7. Requirements for compliance with applicable OSHA, NASA, and GSFC regulations and requirements;
- f. Provide guidance to personnel regarding exposure to hazardous noise levels, recommend types of hearing protection, and specify hearing protection attenuation requirements;
 - g. Provide annual hearing conservation training to civil service employees enrolled in the Program;
 - h. Notify the Office of Human Capital Management of scheduled and completed hearing conservation training courses so that courses can be advertised and completed training can be recorded in the SATERN Learning Management System;
 - i. Provide the MEMD Health Unit (Greenbelt or WFF as appropriate) with an updated list or database of employees enrolled in the Program, and maintain archived lists indicating dates of training and audiometric testing;
 - j. Perform a follow-up occupational noise evaluation and risk assessment for any employee who has suffered a STS, or on referral from the MEMD Health Unit (Greenbelt or WFF), before being allowed to return to work in a hazardous noise environment;
 - k. Recommend further training, engineering controls, administrative controls, and PPE based on follow-up occupational noise evaluations of employees with confirmed STS;
 - l. Remove employees from the Hearing Conservation Program who are determined not to be exposed to levels requiring their inclusion;
 - m. Inform the MEMD Health Unit of any employee removed from the Hearing Conservation Program so that an exit or termination audiogram can be scheduled and obtained;
 - n. Inform Hearing Conservation Program enrollees, and their supervisors, who have not met the requirements of the Program that they shall not be permitted to perform work activities associated with potentially hazardous noise levels;
 - o. Maintain noise exposure assessment records, including sound level survey and dosimetry results, and provide personnel with access to their respective individual results;
 - p. Maintain properly calibrated noise monitoring instrumentation and use only instrumentation that is within its current calibration period;
 - q. Review facility plans, projects and operational procedures to assess the adequacy of precautions taken to control hazards and “Buy Quiet and Quiet by Design” tenets;
 - r. Review GSFC Forms 23-59, 23-73, and NASA Form 1707 when it is indicated there are plans to purchase or design facilities and equipment expected to generate noise levels at or greater than 80 dBA;
 - s. Assist Purchase Requisition Initiators and Facilities Planners, Engineers and Operations in using the NASA Buy Quiet Roadmap Process and making determinations about purchasing equipment and facilities, when requested;
 - t. Follow the requirements of Section 3 in conducting noise monitoring; and
 - u. Provide periodic Hearing Conservation Program status reports to the Industrial Hygiene Services COR.

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1.4 The WFF Safety Office IH shall:

Accomplish the IH responsibilities in Section 1.3 for WFF, except where otherwise stated.

1.5 The MEMD Health Unit (Greenbelt and WFF) shall:

- a. Provide baseline and annual audiometric testing to civil service employees enrolled in the GSFC Hearing Conservation Program in accordance with NPR 1800.1, GPR 1840.2, and 29 CFR 1910.95;
- b. Contact and schedule audiometric testing for employees enrolled in the Hearing Conservation Program, and provide written notification of the need to avoid exposure to noise levels of 80 dBA or greater for 14 hours preceding testing;
- c. Provide baseline and annual medical evaluations to Hearing Conservation Program enrollees to include medical and work history with emphasis on past, present, and anticipated noise exposure;
- d. Provide written notification of audiometric testing results indicating a STS to both the employee and supervisor within 21 days of determination, and explain the possibility, need and plans for further testing and/or referral;
- e. Perform a retest within 30 days if an annual audiogram indicates that an employee has suffered a STS, and consider the results of the retest as the annual audiogram;
- f. Provide written notification to both employee and supervisor within 21 days of receiving confirmation that a STS has occurred;
- g. Provide the IHO with a result summary of the audiometric testing for each employee enrolled in the Hearing Conservation Program;
- h. Consult with the IHO regarding any employee who has sustained a STS or confirmed STS to facilitate evaluation of the workplace and employee work practices, and possible eventual reassignment if other measures are not achievable;
- i. Report new cases of work-related STSs to the OS&H Division (or WFF) Mishap Program Manager;
- j. Consider the annual audiogram as the new baseline reference audiogram when medical evaluation confirms that the STS is permanent or when medical evaluation shows significant improvement;
- k. Maintain audiometric test records and other information pertinent to the medical surveillance requirements;
- l. Obtain termination audiograms for Hearing Conservation Program enrollees upon termination of employment or removal from participation in the Program;
- m. Ensure that occupational hearing conservationists performing audiometric testing are qualified, certified, and knowledgeable in operating the audiometer, and function under the supervision of a physician or audiologist;
- n. Ensure the proper functioning and calibration of the audiometer in accordance with manufacturer, OSHA, and ANSI specifications; and
- o. Maintain audiometer calibration records and records of the background sound pressure levels of the audiometric testing room.

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1.6 The Office of Human Capital Management shall:

- a. Ensure that civil service employees enrolled in the Hearing Conservation Program complete GSFC Form 17-26 or 17-26W, Exit Clearance Record, prior to termination of employment. GSFC Form 17-26 and 17-26W require an exit medical evaluation (i.e., termination audiogram) clearance from the MEMD Health Unit (Greenbelt or Wallops);
- b. Advertise hearing conservation training in the SATERN Learning Management System; and
- c. Record completed hearing conservation training in the SATERN Learning Management System.

1.7 The OS&H Division Mishap Program Manager or WFF Mishap Program Manager shall:

Record work-related STSs in the Incident Reporting Information System (IRIS) for OSHA 300 log reporting purposes in accordance with GPR 8621.4.

1.8 Supervisors and Managers shall:

- a. Notify the IHO of any hazardous noise areas, operations suspected of generating hazardous noise levels, or changes in operations that introduce potentially hazardous noise, and provide to the IHO lists of affected personnel;
- b. Ensure that employees enrolled in the Hearing Conservation Program receive baseline, annual, and termination audiograms (in accordance with GSFC Form 17-26 or 17-26W, Exit Clearance Record);
- c. Refer personnel who complain of hearing loss or medical pathology of the ear to the Health Unit or other health care provider;
- d. Ensure that all personnel in designated noise hazard areas or who are exposed to noise levels at or greater than 82 dBA, regardless of duration, are provided with personal hearing protection. (Personnel exposed to noise levels for short time periods at or greater than 82 dBA but less than 85 dBA are strongly encouraged to use the provided hearing protection, although use is not obligatory within this exposure range unless exposure meets the 8-hour action level specified in 2.2 and the individual has had a STS or has not had a baseline audiogram);
- e. Ensure that all personnel in designated noise hazard areas or who are exposed to noise levels at or greater than 85 dBA wear personal hearing protection, regardless of duration;
- f. Ensure that adequate and various types of personal hearing protection are available in designated hazardous noise areas for use by personnel and visitors;
- g. Ensure that signs stating "Caution Hazardous Noise Hearing Protection Required" are posted in designated hazardous noise areas, and that labels with this caution are affixed to any portable equipment that generates hazardous noise, i.e. noise levels at or greater than 85 dBA at the operator's position. Warning lights and audible indicators may also be used to communicate an impending or active hazardous noise area, e.g. acoustics chamber;
- h. Ensure that personnel who participate in a hearing conservation program complete the required annual training;
- i. Cooperate with the IHO in reassigning enrolled Hearing Conservation Program employees that have not completed the requirements of this directive to positions with noise exposure less than the action level until such time that these employees come into compliance;

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- j. Cooperate with the IHO in implementing recommendations for engineering controls, PPE, and reassignment of duties;
- k. Select equipment for purchase in accordance with NASA “Buy Quiet and Quiet By Design” principles and with the lowest noise emissions reasonably achievable;
- l. Ensure that engineering and administrative controls recommended by the IHO are designed and implemented to reduce noise exposure below the acceptable limit or to the maximum extent feasible;
- m. Practice “Buy Quiet and Quiet By Design” principles in the design and modification of buildings and facilities; and
- n. Maintain noise-generating equipment and controls to preclude noise increases to the greatest extent possible, e.g., worn gears, faulty bearings, unbalanced fans, corroded mufflers, non-lubricated fittings, pressurized gas releases, and vibrating pipes and equipment.

1.9 Facilities Planners, Engineers and Operations shall:

- a. Follow “Buy Quiet and Quiet By Design” principles for facility, equipment, and process plans and designs;
- b. Submit and review GSFC Form 23-73, indicating equipment and facilities expected to generate noise levels at or greater than 80 dBA. This would include equipment and facilities integral to the development of the space; and
- c. Use the NASA Buy Quiet Roadmap Process at <http://buyquietroadmap.com/buy-quiet-purchasing/buy-quiet-program-requirements/> for selecting equipment and facilities expected to generate noise levels at or greater than 80 dBA.
- d. Facilities Planners, Engineers, and Operations may seek the guidance and assistance of the OS&H Division IHO or the WFF IH in using the NASA Buy Quiet Roadmap Process and in making determinations about purchasing equipment and facilities.

1.10 Contracting Officer’s Representatives (CORs) shall:

- a. Notify the IHO of any contractor operations suspected of generating hazardous noise levels;
- b. Ensure that work-related STSs to contractor personnel are recorded and maintained on their organizations’ OSHA 300 logs;
- c. Ensure that contractors practice “Buy Quiet and Quiet By Design” principles in selecting equipment for purchase and in designing systems / facilities to keep noise at levels as low as reasonably achievable;
- d. Ensure that contractors submit to the IHO and maintain supporting documentation related to “Buy Quiet and Quiet By Design” decisions;
- e. Obtain annual contractor hearing conservation program status reports (participant names, completed training and audiometric testing dates) within 30 days following the fiscal year end, and forward the reports to the IHO; and
- f. Communicate to Contracting Officer to include the annual contractor hearing conservation program status report as a deliverable in the contract.

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1.11 Purchase Requisition Initiators shall:

- a. Ensure that appropriate purchase requisition forms (e.g. GSFC Form 23-59, NASA Form 1707 or equivalent) are completed and properly indicated for hazardous noise if the procurement is for equipment or facilities which may generate noise levels at or greater than 80 dBA;
- b. Ensure that specifications for new equipment and facilities that generate noise levels at or greater than 80 dBA are in keeping with Buy Quiet principles;
- c. Use the NASA Buy Quiet Roadmap Process at <http://buyquietroadmap.com/buy-quiet-purchasing/buy-quiet-program-requirements/> for selecting equipment and facilities expected to generate noise levels at or greater than 80 dBA; and
- d. Purchase Requisition Initiators may seek the guidance and assistance of the OS&H Division IHO or the WFF IH in using the NASA Buy Quiet Roadmap Process and making determinations about purchasing equipment and facilities.

1.12 Procurement Operations Division Contract Specialists / Officers shall:

Verify that NASA Form 1707 and supporting documents are completed and included in the purchase request package for procurements involving equipment or facilities which may generate hazardous noise levels (at or greater than 80 dBA); and can assist Purchase Initiators and the OS&H Division in checking other non-Procurement Operations Division forms (e.g. GSFC Form 23-59).

1.13 Resource Analysts/Managers, Supply Systems Analysts, Buyers, Acquisition Specialists, and others responsible for procurements shall:

- a. Verify that appropriate purchase requisition forms (e.g. GSFC Form 23-59, NASA Form 1707 or equivalent) are completed and included for procurements involving equipment or facilities which may generate hazardous noise levels (at or greater than 80 dBA); and
- b. Return purchase request packages to the initiator or contact the IHO when it appears that the appropriate forms and supporting documents have not been completed.

1.14 Employees shall:

- a. Wear hearing protection in accordance with this directive and as required by supervisors;
- b. Store and maintain hearing protection in a functional and sanitary condition;
- c. Cooperate with supervisors, the IHO, and the Health Unit in activities undertaken to evaluate exposure to hazardous noise;
- d. Notify supervisors of areas, operations, or equipment that may generate hazardous noise levels; and
- e. Have the right to decline participation in the Hearing Conservation Program by submitting a written declination statement to the IHO; however, such a declination may result in exclusion from performing certain work functions.

1.15 Employees Enrolled in the Hearing Conservation Program shall:

- a. Complete all requirements in this directive, including annual hearing conservation training and audiometric testing;
- b. Ensure that audiograms resulting from tests conducted by a private medical provider are provided to the GSFC Health Unit (Greenbelt or WFF);
- c. Have the right to obtain audiometric testing and medical surveillance through a private medical provider; and
- d. Ensure that a termination or exit audiogram is obtained upon termination of employment (GSFC Form 17-26 or 17-26W, Exit Clearance Record) or removal from the Hearing Conservation Program.

2. NOISE EXPOSURE LIMITS**2.1 Permissible Exposure Limit**

- a. Protection against exposure to hazardous noise shall be provided when sound levels exceed those in the Tables 1&2 below;
- b. When personnel are subjected to sound levels exceeding those listed in Tables 1&2, feasible administrative or engineering controls shall be utilized; and
- c. If such controls fail to reduce sound levels within the levels of Tables 1&2, personal protective equipment shall be provided and used to reduce sound levels to within the levels of Tables 1&2.

Table 1. Continuous Noise Permissible Exposure Limits

Duration (Hours)	Sound Level (dBA)*
16	82
8	85
4	88
2	91
1	94
0.5	97
0.25	100
0.125 or less	103
* Measured on the A-scale(slow response)	

Table 2. Impulse Noise Permissible Exposure Limits

Sound Level (dB)*	Permitted Impulses/Day
140	100
130	1,000
120	10,000
* Peak sound-pressure level.	

2.2 Action Level

The NASA action level is an 8-hour TWA sound level of 82 dBA. The action level represents 50% of the noise dose of the permissible exposure limit explained in Section 2.1.

3. HEARING CONSERVATION

3.1 Hearing Conservation Program

- The Hearing Conservation Program shall be administered for each employee whose noise exposure equals or exceeds the action level (Section 2.2) for 30 days or more per year, without regard to any attenuation provided by the use of personal hearing protection;
- The Hearing Conservation Program shall be administered for each employee whose noise exposure equals or exceeds the permissible exposure limits (Section 2.1) for any one day per year, without regard to any attenuation provided by the use of personal hearing protection;
- GSFC contractors shall administer a hearing conservation program for their personnel whose noise exposure equals or exceeds the action level (Section 2.2) or permissible exposure limits (Section 2.1) as stated in 3.1.a-b;
- GSFC contractors shall provide annual hearing conservation program status reports to the IHO and COR within 30 days of the fiscal year end; and
- Hearing conservation program elements shall include noise exposure monitoring, hearing protection methods, audiometric testing and medical surveillance, and training.

3.2 Noise Exposure Monitoring

- Noise hazard assessments (qualitative or quantitative sound level surveys) shall be performed as part of industrial hygiene surveys and evaluations to form a basis for conducting noise exposure monitoring;
- Any new operation, process, or equipment with the potential for generating hazardous noise shall be evaluated by the IHO prior to implementation;
- Noise exposure monitoring shall be conducted when any information indicates that an employee's exposure may equal or exceed the action level;
- Noise exposure monitoring shall be conducted whenever a change in operations, processes, equipment, work practices, or controls alters noise exposures to the extent that additional employees

may be exposed at or above the action level, or the attenuation provided by personal hearing protection may be rendered inadequate to attenuate sound below the permissible limit;

- e. Noise exposure computations shall be conducted in accordance with Appendix A of OSHA 29 CFR 1910.95 and NPR 1800.1;
- f. Employees or their representatives shall be provided the opportunity to observe noise monitoring activities;
- g. Noise exposure monitoring shall be conducted to determine noise dose using noise dosimeters or a sound level meter; and
- h. Sound-level meters and personal noise dosimeters must meet ANSI Standard S1.4 and S1.25 respectively.

3.3 Hearing Protection Methods

3.3.1 “Buy Quiet and Quiet by Design”

- a. Equipment and facilities selected for purchase or design shall be those which minimize hazardous noise exposure to personnel and which have noise emissions that are as low as reasonably achievable;
- b. “Buy Quiet and Quiet By Design” principles and the NASA Buy Quiet Roadmap Process at <http://buyquietroadmap.com/buy-quiet-purchasing/buy-quiet-program-requirements/> shall be followed for selecting equipment and facilities expected to generate noise levels at or greater than 80 dBA;
- c. GSFC Forms 23-59, GSFC Form 23-73, NASA Form 1707, and contractors’ equivalent forms shall be completed and properly indicated if the equipment or facilities intended to be purchased or designed is expected to generate noise levels at or greater than 80 dBA;
- d. GSFC Forms 23-59, GSFC Form 23-73, NASA Form 1707, and contractors’ equivalent forms shall be routed through the OS&H Division IHO for approval and maintained; and
- e. Specialized research project equipment and flight hardware that may be expected to generate high noise levels shall not be subject to 3.3.1a and 3.3.1b above.

3.3.2 Engineering Controls

- a. Feasible engineering controls shall be implemented when personnel are subjected to sound levels exceeding the permissible exposure limit of 85 dBA as an 8-hour TWA or impulsive noise above 140 dB, as defined in Section 2.1;
- b. Feasible engineering controls that do not reduce noise exposure below permissible limits shall nonetheless be implemented to minimize exposure to hazardous noise levels;
- c. If engineering controls fail to reduce sound levels to below permissible limits, administrative controls and personal hearing-protection shall be used in that order; and
- d. Engineering controls should be utilized to reduce exposure to noise when potential exposures approach, but do not exceed, permissible limits.

3.3.3 Administrative Controls

- a. Feasible administrative controls, including work practice controls, shall be utilized if engineering controls fail to reduce sound levels below the permissible limit; and
- b. If hearing-protective equipment or engineering controls are not sufficient to attenuate noise to less than 85 dBA, the duration of time spent in the noise hazard area shall be limited, so as not to exceed the exposure limits specified in Section 2.

3.3.4 Personal Hearing Protection

- a. Personal hearing protection shall be used to attenuate noise exposure until engineering or administrative controls can be implemented, or if engineering and administrative controls are not feasible or fail to reduce sound levels below permissible limits specified in Section 2.1;
- b. Personal hearing protection shall attenuate employee noise exposure to below permissible limits specified in Section 2.1 (85 dBA as an 8-hour TWA);
- c. The calculation of personal hearing protection noise attenuation shall be conducted in accordance with NPR 1800.1;
- d. Double hearing protection, i.e. ear muffs and ear plugs in combination, shall be used when noise exposure equals or exceeds 110 dBA, regardless of duration, or when one set of hearing protection is not sufficient to attenuate noise exposure to below the permissible limit;
- e. Personnel exposed to noise levels at or exceeding the action level as specified in Section 2.2 (82 dBA as an 8-hour TWA) and who have experienced a STS shall wear personal hearing protection that attenuates noise exposure to below the action level;
- f. Personal hearing protection shall be worn by personnel who have not yet had a baseline audiogram established when exposed to noise at levels at or exceeding the action level;
- g. Special hearing-protective equipment, such as sound-suppression communication headsets, may be used in noise hazard areas. These devices should be inspected by the user regularly. Sound-suppression headsets shall not be used if they have been damaged, altered, or modified in any way that affects the attenuation characteristics. If replacement parts are available, the headsets may be repaired and reused; and
- h. If sound-suppression headsets are not permanently issued to employees, such equipment shall be cleaned and sanitized before re-issuance.

3.4 Audiometric Testing and Medical Surveillance

- a. Audiometric testing and medical surveillance performed in accordance with NPR 1800.1 shall be provided to each civil service employee enrolled in the Hearing Conservation Program;
- b. Contract personnel enrolled in their respective organizations' hearing conservation programs shall receive audiometric testing and medical surveillance from their organization;
- c. Audiometric testing shall include a baseline and annual audiogram, in accordance with 29 CFR 1910.95;
- d. Medical surveillance shall include a baseline audiometric examination upon initial enrollment or within 30 days of enrollment;

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- e. Each annual examination of civil service employees at the GSFC Health Unit (Greenbelt or WFF) shall include a history of noise exposure at GSFC, a history of the use of personal hearing protection, and a history of other possible occupational or non-occupational exposures to noise;
- f. Personnel who suffer from acute diseases of the ear shall not be placed in hazardous noise areas until the condition has abated, particularly if such diseases preclude the wearing of hearing protectors, cause hearing impairment, or produce tinnitus;
- g. Civil service employees enrolled in the Hearing Conservation Program shall receive an exit audiogram prior to termination of employment at GSFC or removal from the Hearing Conservation Program. An annual audiogram, if completed within 6 months of the termination, transfer, or retirement date, may be substituted for the exit audiogram;
- h. Audiometers shall be calibrated to meet the requirements specified in the latest revision of ANSI S3.6; and
- i. Ambient noise levels in audiometric testing rooms shall meet the specifications in the latest version of ANSI S3.1.

3.5 Training

- a. Each civil service employee enrolled in the Hearing Conservation Program and their supervisor shall receive initial and annual training from the OS&H Division IHO;
- b. Contract personnel enrolled in their organizations' hearing conservation programs shall receive initial and annual training from their respective organizations;
- c. Encouragement may be given to use personal hearing protection when exposed to hazardous noise in non-occupational settings (e.g., from lawn mowers, firearms, tools, etc.);
- d. Training shall include the following:
 - 1) An overview of 29 CFR 1910.95, NPR 1800.1, and this GPR;
 - 2) The effects of noise on hearing (including permanent hearing loss);
 - 3) Identification of hazardous noise sources in work areas;
 - 4) Factors that may contribute to hearing loss;
 - 5) Noise control principles;
 - 6) The purpose of personal hearing protection, the advantages, disadvantages, and attenuation of various types;
 - 7) Instruction on proper selection of personal hearing protection, fitting, method of insertion, use, and care; and
 - 8) The purpose of audiometric testing, and an explanation of the test procedures.

Appendix A – Definitions

- A.1 Action level** – The exposure level at which enrollment in the Hearing Conservation Program is required, as determined by a measurement device conforming to ANSI S1.4-1983 or S1.25-1991 set to use the A-weighted network with slow meter response. The NASA action level is an 8-hour time-weighted average (TWA) exposure of 82 decibels on the A-weighted scale (dBA), or equivalently, a dose of 50 percent using a criterion level of 85 dBA and a 3-dBA exchange rate. The OSHA action level is an 8-hour TWA of 85 dBA, or equivalently, a dose of 50 percent using a criterion level of 90 dBA and a 5-dBA exchange rate.
- A.2 Administrative control** – Method of controlling employee exposures by job rotation, work assignment, scheduling, or time periods away from the hazard.
- A.3 Audiogram** - A chart, graph, or table resulting from an audiometric test. An audiogram shows an individual's hearing threshold level as a function of frequency in Hertz (Hz).
- A.4 Baseline audiogram** - An audiogram against which future audiograms are compared.
- A.5 “Buy Quiet and Quiet By Design” principles** – Principles that endeavor to achieve long-term reduction of employee noise exposures through purchase and design of equipment with realistic and achievable noise criteria considered in advance. This approach requires designers and engineers to consider noise emission when purchasing and designing equipment that is expected to generate noise levels at or exceeding 80 dBA (measured typically around 1 meter from the source).
- A.6 Continuous noise** – Noise greater than background levels for a period of time with peaks of intensity that occur at intervals of one second or less.
- A.7 Decibel (dB)** – Unit of measurement of sound level. A unit used to express sound power level.
- A.8 Decibel A-weighted (dBA)** – Sound level in decibels read on the A-weighted scale, which discriminates against very low frequencies (as does the human ear) and is, therefore, better for measuring general sound levels.
- A.9 Engineering control** - Method of controlling employee exposure by modifying the source or reducing the sound level emitted. Examples of engineering controls include noise dampening materials, noise reducing mechanical devices, physical barriers, enclosures, isolation of the employee, or other designs that reduce the sound level at the source of noise generation or along the path from the point of generation to the individual. This does not include protective equipment such as ear muffs, ear plugs, or administrative controls.
- A.10 Hazardous noise** - Noise of sufficient duration and intensity as to be capable of producing adverse health effects such as permanent loss of hearing. Sounds louder than 80 dB may be considered potentially hazardous.
- A.11 Hazardous noise area** - Any work area where the noise level is at or greater than 85 dBA, or where the environmental impulse noise level is at or above 140 dB peak C or linear, regardless of duration of exposure or number of impulses.
- A.12 Hearing conservation program** - Program that prevents workplace noise from producing a standard threshold shift in the hearing ability of any employee. It includes requirements for noise exposure monitoring, audiometric testing and medical surveillance, hearing protection methods, and training. The collective requirements in this GPR constitute the GSFC Hearing Conservation Program.

- A.13 Hertz (Hz)** – Unit of measurement of frequency, numerically equal to cycles per second.
- A.14 Impulsive noise** – Noise having a high peak of short duration or a sequence of such peaks. A sequence of impulses in rapid succession is termed repetitive impulsive noise. The peaks of intensity are considered to occur at intervals of greater than one second.
- A.15 Noise** – Any unwanted sound.
- A.16 Noise dose** – The ratio, expressed as a percentage, of the cumulative noise exposure over a stated period, which takes into account both the intensity of the sound and the duration of the exposure.
- A.17 Noise dosimeter** - An instrument that integrates a function of sound pressure over a period of time in such a manner that it directly indicates a noise dose.
- A.18 Occupational hearing conservationist** – A person who, under the supervision of an audiologist or physician, conducts pure-tone air-conduction audiometric testing and other associated duties.
- A.19 Personal hearing protection** – Device such as ear plugs, ear muffs, and semi-insert ear plugs (canal caps) worn to reduce the noise exposure level and risk of hearing loss.
- A.20 Revised baseline audiogram** – The most recent audiogram that has established a confirmed STS upon retest or that has established a significant improvement. The revised baseline shall be used as the basis of comparison for future audiograms.
- A.21 Sound** - A fluctuation of air pressure which is propagated as a wave through air.
- A.22 Sound level meter** – An instrument for measuring sound pressure levels in decibels, referenced to 0.0002 microbars.
- A.23 Standard threshold shift (STS)** – A change in hearing threshold relative to the baseline audiogram of an average of 10 dB or more at 2000, 3000, and 4000 Hz in either ear. A significant improvement is considered an improvement in hearing threshold relative to the baseline audiogram of an average of 5 dB or more at 2000, 3000, and 4000 Hz in either ear.
- A.24 Temporary threshold shift** – A change in hearing threshold, primarily due to exposure to high-intensity noise, which is usually recovered within 14 to 72 hours.
- A.25 Time-weighted average (TWA) sound level** - That sound level which, if constant over an eight-hour exposure, would result in the same noise dose as is measured.

Appendix B – Acronyms

ANSI	American National Standards Institute
CAOHC	Council for Accreditation in Occupational Hearing Conservation
CFR	Code of Federal Regulations
COR	Contracting Officer's Representative
dB	Decibel
dba	Decibel, A-Weighted Scale
FRC	Federal Records Center
GPR	Goddard Procedural Requirements
GSFC	Goddard Space Flight Center
Hz	Hertz
IH	Industrial Hygiene or Industrial Hygienist
IHO	Industrial Hygiene Office
IRIS	Incident Reporting Information System
MEMD	Medical and Environmental Management Division
NASA	National Aeronautics and Space Administration
NPD	NASA Policy Directive
NPR	NASA Procedural Requirements
NPRC	National Personnel Records Center
NRRS	NASA Records Retention Schedules
OS&H	Occupational Safety and Health
OSHA	Occupational Safety and Health Administration
PPE	Personal Protective Equipment
STS	Standard Threshold Shift
TWA	Time-Weighted Average
WFF	Wallops Flight Facility

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CHANGE HISTORY LOG

Revision	Effective Date	Description of Changes
Baseline	04/06/2008	Initial Release
A	11/10/2010	Administratively Revised to update the Responsible Office Code, Organization Title and organization name within the document.
B	05/16/2014	Revised to reflect stronger Buy Quiet policy language, and to add referenced forms, roles and responsibilities, and records.

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